CLAIMS

1. A method of regulating cerebrospinal fluid flow in a hydrocephalus patient, comprising:

providing an implantable shunt system having an adjustable resistance valve for regulating the flow of cerebrospinal fluid into and out of a ventricular cavity of the patient and including a sensor element for measuring a physiological characteristic of the ventricular cavity, and a selectively operable external system controller device for communicating with the implantable shunt system, the system controller device being configured to effect an adjustment of the resistance of the valve when the device is applied to the patient;

energizing the implantable shunt system with the system controller device;

detecting a value of the physiological characteristic of the ventricular cavity measured by the sensor element;

comparing the measured value with a predetermined target value for that physiological characteristic;

determining a desired resistance to achieve the predetermined target value for that physiological characteristic; and

adjusting a current resistance of the valve to achieve the desired resistance.

2. The method of claim 1, wherein the step of detecting a value of the physiological characteristic comprises communicating data representative of the measured value of the physiological characteristic from the sensor element to the system controller device.

3. The method of claim 2, wherein the step of communicating includes receiving an input signal generated from the sensor element with the system controller device.

4. The method of claim 1, wherein the step of adjusting a current resistance comprises communicating a command to adjust the resistance from the system controller device to the valve.

5. The method of claim 1, wherein the step of adjusting a current resistance is repeated until the predetermined target value is reached.

6. The method of claim 4, wherein the step of communicating includes transmitting an output control signal generated from the system controller device to the valve.

7. The method of claim 1, wherein the step of determining a desired resistance includes determining whether an increase or decrease in the current resistance is necessary to achieve the predetermined target value.

8. The method of claim 5, wherein the step of adjusting a current resistance is repeated after a period of time has elapsed sufficient for the patient to respond to the current resistance of the valve.

9. The method of claim 1, wherein the physiological characteristic is volume, and the sensor element is configured to measure a volume of the ventricular cavity.

10. The method of claim 1, further including the step of detecting the value of an additional physiological characteristic of the ventricular cavity.

11. The method of claim 12, wherein the implantable shunt system includes a second sensor element for measuring the additional physiological characteristic.

12. The method of claim 11, wherein the second sensor element is a pressure sensor, and the additional physiological characteristic is ventricular pressure.

13. The method of claim 1, wherein the method is used to manage cerebrospinal fluid flow in a patient afflicted with normal pressure hydrocephalus.

14. The method of claim 13, wherein the step of energizing the implantable shunt system occurs after the patient becomes symptomatic of normal pressure hydrocephalus.

15. The method of claim 14, wherein the method is repeated when the patient becomes symptomatic of normal pressure hydrocephalus.

16. The method of claim 15, wherein the method is repeated after a period of time has elapsed sufficient for the patient to respond to the current resistance of the valve.

17. An apparatus for regulating cerebrospinal fluid flow in a hydrocephalus patient, comprising:

an implantable shunt system having an adjustable resistance valve for regulating the flow of cerebrospinal fluid into and out of a ventricular cavity of the patient, and including a sensor element for measuring a physiological characteristic of the patient; and

a selectively operable external system controller device for communicating with the implantable shunt system, the system controller device being configured to effect an adjustment of the resistance of the valve when the device is applied to the patient;

wherein the sensor element is a volume sensor for detecting volumetric variations within the ventricular cavity.

18. The apparatus of claim 17, wherein the sensor element is coupled to the valve.

19. The apparatus of claim 17, wherein the system controller device is configured to receive an input signal generated from the sensor element during operation, the input signal being representative of a measured volume of the ventricular cavity.

20. The apparatus of claim 19, wherein the system controller device is further configured to transmit to the valve an output control signal that commands the valve to adjust the resistance during operation.

21. The apparatus of claim 20, wherein the system controller device includes a microprocessor for comparing the measured volume detected by the volume sensor to a predetermined target volume for the patient.

22. The apparatus of claim 21, wherein the target volume is determined through clinical assessment of the patient and the microprocessor is preprogrammed with the target volume prior to the application of the device to the patient.

23. The apparatus of claim 21, wherein the microprocessor is programmed to calculate a desired resistance for the valve to achieve the target volume.

24. The apparatus of claim 23, wherein the implantable shunt system further includes a second sensor element for measuring an additional physiological characteristic of the patient, the second sensor element being configured to transmit data representing the measured value of the additional physiological characteristic to the system controller device.

25. The apparatus of claim 24, wherein the second sensor element is a pressure sensor and the additional physiological characteristic is ventricular pressure.

26. The apparatus of claim 17, wherein the adjustable resistance valve is configured for implantation in a peritoneal cavity of the patient.

27. The apparatus of claim 20, wherein the system controller device further includes a timed shutoff mechanism.